An Effective EMS Risk Identification and Management Process

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Some Terms

Aspect: Element of an organization's activities, products or services that can interact with the environment.

Significant Aspects: Those aspects of an organization that have or can have significant impact(s) on the environment.

Risk: An existing or future event, action, or condition that might prevent achieving a goal, objective, milestone or approved work scope (organizational success).

Risk are characterized by: the probability that the event, action or condition will occur and the severity of the consequences if that event, action or condition does occur.

Systems Thinking: An approach to problem solving that seeks to understand not only the individual elements but the linkages and interactions between the elements that compose the system.

An effective EMS Risk process should consider the many types of risks.

Normal Operations

Environmental Aspects
- Hazardous waste production
- Water discharges
- Air emissions

Environmental Program Risks
- Change in regulations or regulator
- Change in resources
- Line performance

Environmental Worker Risks
- Ergonomic
- Exposures
- Heat Stress for field workers

Off Normal Events

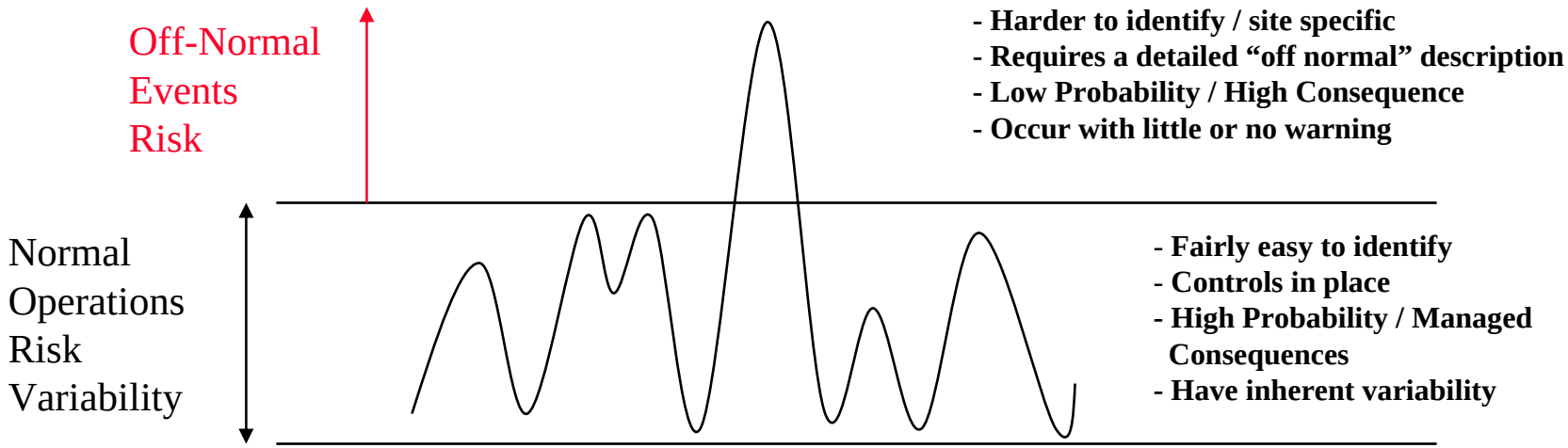
Environmental Aspects
- Plausible off normal events for each

Accidents
- Explosion
- Building fire

Natural Phenomenon
- Earthquake
- Weather

Significant Programmatic or Corporate Decision
- New program
- Plant closure
- Severe budget cut
- Loss of key staff

Normal vs. Off-Normal EMS Risks



The fact that you have both Normal and Off-Normal event possibilities suggests a two step risk evaluation process.

This will result in two sets of "Significant Aspects".

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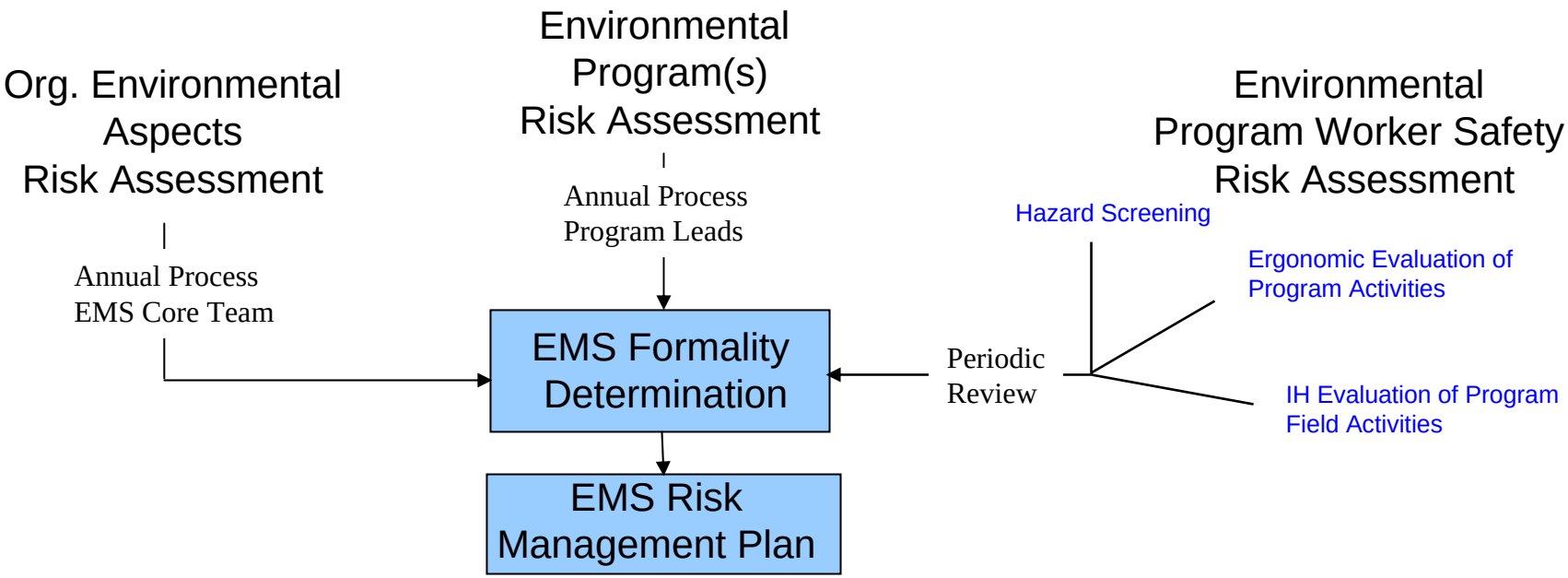
Use a “Systems” Approach



- Policies
- Staff Training
- Technical Procedures
- Permits / Work Authorizations
- Effective communication methods
- Engineered & Administrative Controls
- Project Evaluations
- Quality Significant Procurement
- Corrective / Preventive Action Process

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Aspects Risk Evaluation – What to consider

- Environmental impacts
- Financial liability / costs
- Corporate reputation
- Community relations
- Programmatic impacts
- Safety & health
- Regulator compliance
- Others that are important to your organization

Aspects Risk Evaluation – Determine your approach

- Local approach (e.g. look only within the site)
- Global approach (e.g. would consider such things as how energy that feeds your site is produced, consumption of natural resources)
- Regulatory / Liability approach (e.g. cradle to grave for hazardous waste)
- Span of Influence approach (e.g. commute aspects of employees)

Recommend a blend of these.

Aspect Risk Scoring
Normal Operations

ASPECT: Water Discharges - Normal Operations

		Risks of Impact						
Environmental Impact		**Environmental Damage**	**Safety and Health**	**Programmatic Impact**	**Compliance**	**Financial liability or cost**	**Negative Reputation or Publicity**	**Total Risks**
Contamination of air		0	0	0	0	0	0	0
Contamination of water		1	0	1	1	1	1	5
Contamination of soil		1	1	0	1	0	0	3
Contamination of facilities (building or equipment)		1	0	0	0	1	0	2
Offsite disposal (landfill or long term storage)		0	0	0	0	0	0	0
Exposure to workforce		0	1	0	0	0	0	1
Exposure to public		0	0	0	0	0	0	0
Effect on Wildlife or Habitat		1	0	0	0	0	0	1
								12

Risks		**Value**
Negligable		0
low		1
medium		2
high		3

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Aspect Risk Scoring
Off-Normal Event

ASPECT: Water Discharges - Off Normal

		Risks of Impact						
Environmental Impact	**Probabilty**	**Environmental Damage**	**Safety and Health**	**Programmatic Impact**	**Compliance**	**Financial liability or cost**	**Negative Reputation or Publicity**	**Total Risks**
Contamination of air	0	0	0	0	0	0	0	0
Contamination of water	1	2	0	2	2	2	2	10
Contamination of soil	0	0	0	0	0	0	0	0
Contamination of facilities (building or equipment)	1	0	0	2	2	2	2	8
Offsite disposal (landfill or long term storage)	0	0	0	0	0	0	0	0
Exposure to workforce	0	0	0	0	0	0	0	0
Exposure to public	0	0	0	0	0	0	0	0
Effect on Wildlife or Habitat	0	0	0	0	0	0	0	0
								18

Off Normal Scenario: A chemical discharge from site operations to the sanitary sewer that negatively affects operations at the city's sewer plant.

Risks		**Value**
Negligable		0
low		1
medium		2
high		3
Probability		**Value**
zero or N/A	0	0
low	<20%	1
medium	20-50%	2
high	50-80%	3
very high	>80%	4

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Aspect Risks Summary

Aspects	Contamination of Air		Contamination of Ground Water or Surface Water		Contamination of Soil		Contamination of Facilities (bldgs or equip.)		Offsite Storage(landfill or long term)		Exposure to Workforce		Exposure to Public		Depletion of Natural Resources		Effect on Wildlife and Habitat		Total Impact Score - Normal Operations	Probability Multiplier due to change from prior year baseline.	Adjusted Impact Score - Normal Operations	Rank - Top 5 Significant Identified in Red	Total Impact Score - Off Normal Event	Rank
	N	ON	N	ON	N	ON	N	ON	N	ON	N	ON	N	ON	N	ON	N	ON						
Air Emission	6	6	0	0	0	0	2	0	0	0	3	7	0	0			0	0	11	1	11	2	13	11
Legacy Asbestos	1	4	0	0	0	0	3	8	0	4	0	9	0	9			0	0	4	1	4	13	34	4
Biological Agents	2	0	0	0	0	0	0	11	0	0	3	15	0	15			0	11	5	1.1	5.5	9	52	1
Contaminated Sites (Areas)	0	0	3	0	2	0	0	0	0	0	0	0	0	0			0	0	5	1	5	11	0	14
Water Discharges	0	0	6	10	1	0	2	1	2	1	0	0	0	4			1	4	12	1.1	13.2	1	20	7
Hazardous Material	0	0	0	0	0	0	1	0	0	0	3	12	4	1			0	0	8	1	8	5	13	11
Hazardous Waste	0	0	0	0	0	0	0	2	4	0	1	14	0	0			0	0	5	1.1	5.5	8	16	9
Universal Waste	0	0	0	0	0	0	2	3	0	0	2	5	4	8			0	0	8	1	8	5	16	9
Hazardous Material Transportation	1	4	0	7	0	7	0	5	0	1	0	14	2	0			0	5	3	1	3	14	43	2
General Transportation	2	-3	0	0	0	0	1	0	1	1	1	5	1	-1			1	0	7	1.1	7.7	6	2	18
Solid Waste (Non-Hazardous)	0	0	0	0	0	0	0	0	3	12	0	0	0	0			1	0	4	1.1	4.4	12	12	12
Radiological Materials	0	0	0	5	0	6	4	5	0	3	2	5	0	0			0	0	6	0.9	5.4	10	24	6
Radiological and Mixed Waste	0	6	0	0	0	6	0	7	5	12	0	0	0	9			0	2	5	1.2	6	7	42	3
Material Procurement and Use	1	1	1	1	1	1	0	0	4	7	2	0	0	1			1	1	10	0.9	9	4	12	12
Land Use	0	2	1	1	1	0	0	0	0	2	1	2	0	5			6	2	9	1.2	10.8	3	14	10
Natural Gas Use	4	3	0	1	0	0	0	0	0	3	0	14	0	0			0	0	4	1	4	13	21	6
Electricity Use	1	2	0	1	0	0	0	0	0	0	1	7	0	0			0	0	2	1	2	15	10	13
Water Use	0	0	2	2	0	1	0	7	0	1	0	6	0	0			2	0	4	1	4	13	17	8
Emergency Aspects																								
Site Fire		4		1		0		0		0		2		3		1							11	16
Seismic Event		2		1		1		10		6		5		1		0							26	5

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Environmental Program Risk

- Annual process for each environmental program within the EMS.
- Performed by the Program Leads.
- Considers all forces affecting the program.
- Considers results of program self assessments and audits.
- Risk evaluation uses a corporate methodology.
- Program Leads propose mitigative action to reduce risks of their program.

Environmental Program Risk Scoring

RISK GRADING LEVELS					
		Consequence/Severity			
		Negligible	***Low***	***Medium***	***High***
Likelihood of Occurrence	***Very High***	*Low*	*Medium*	*High*	*High*
	High	*Low*	*Medium*	*High*	*High*
	Medium	*Low*	*Medium*	*Medium*	*High*
	Low	*Low*	*Low*	*Low*	*Medium*
	Negligible	*Low*	*Low*	*Low*	*Low*

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Environmental Program Risk Summary - Example

Environmental Management Programs Risk Assessment Summary

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Program / Risks	Probability	Consequence	Risk Level
Air Quality			
Increased regulation that will require a Title V Permit	Low	Low	Low
Nuissance complaint filed with BAAQMD.	Low	Low	Low
Large Quantity Accidental Release to Atmosphere	Medium	Negligible	Low
Operating without a permit or in violation of permit conditions/limits	High	Medium	High
Reduction in program funding by 10%	High	Medium	High
Increased regulation of diesel powered vehicles and equipment	High	Medium	High
Environmental Planning and Ecology			
Revision of California Red Legged Frog Critical Habitat	High	Medium	High
Delay in Receiving Approval for Recharge Basin Restoration Project	High	Medium	High
Taking of a protected Species	Very High	Low	Medium
Reduction in program funding by 10%	High	Low	Medium

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Normal Operations Risk Management

- Continually seek to improve work controls (seek engineered controls over administrative)
- Stay on top of training
- Continually communicate risk areas
- Standardize processes and procedures
- Develop an effective assessment process with effective corrective/preventive actions
- Seek validation of corrective / preventive actions to assure that they are effective
- Focus effort on reducing severity of consequences

Reduce variability within each risk area.

Off Normal Events Risk Management

- Routinely evaluate plausible failure scenarios.
- Focus on both probability when you can affect it (e.g. fire, explosion) and consequences since they are usually high.
- Establish effective emergency environmental response.
- Establish recovery plans.

Risk Management - Summary

- Include all risk types that can affect your EMS
- Take a systems approach in their evaluation
- Routinely update your risk evaluation
- Consider risks that are both routine and off-normal
- Get input from the line and your EMS/Environmental program leads
- Communicate your risks to top management and your organization - this can help secure your resource needs
- Seek thoughtful and synergistic risk mitigation actions and strategies